*This information is for informational purposes only and cannot be seen as an endorsement.

AT for Vision Accommodations

Thomas, Barker, Rubin, and Dahlmann-Noor (2015) who examined assistive technology (AT) options for children and young people with low vision, found that at present, there is no evidence from controlled clinical trials to guide choice of AT in clinical and educational practice. However, upon researching AT for individuals with vision impairments, key topic areas were identified which are listed in the table of contents below.

If you have further questions about this topic or would like more information or assistance related to visual impairments, please contact an optometrist or consult the Virginia Department for the Blind and Visually Impaired (https://www.vdbvi.org/resources.htm) where you can attain further information or apply for individualized services with an occupational therapist who specializes in AT. If you would like more information on which app is best for you without applying for services, please view Georgia Tech's "Tools for Life" resource at https://gatfl.gatech.edu/favorite-search.php. For further information on job accommodations in the workplace please visit https://askjan.org or https://www.resna.org to find a certified AT specialist. For more information on low interest loans on assistive technology, please visit https://www.atlfa.org.

Table of Contents:

1. Optical Aids
    - There are multiple optical aids available for individuals seeking visual accommodations. Optical aids tend to focus on lenses and non-electronic magnifiers for example there are handheld magnifiers, stand magnifiers, field expanders, special glasses such as Theraspecs (https://www.theraspecs.com) and telescopes available for individuals with visual impairments.

    - For example, an individual with low vision may require a handheld magnifier to read the labels on shelves and boxes in order to stock items correctly. Similarly, a stand magnifier can enlarge anything it is placed in front of and eliminates the need to hold the device if a person requires both hands to manipulate the object in question. Field expanders will typically be added to glasses for an individual who has tunnel vision (see picture below) to expand their field of vision. OrCam, a device for low vision (https://esighteyewear.com/vision-professionals/) is also available as an optical aid. Another option, perhaps for individuals with low vision, is to color code items (such as steps) with brightly colored tape or another easily identifiable marker.

2. Non-Optical Aids
    - Non Optical aids such as high-intensity lamps, enlarged print, and daily living aids are available for individuals with visual impairments. For example, an individual with low contrast sensitivity may require a high-intensity lamp to be able to read documents, order slips, bills, etc. Books or training guides can be purchased in large print versions. Additionally, there are numerous daily living aids to increase independence for individuals with visual impairments, several of which can be found at:
        - https://www.maxiaids.com

- https://www.ncmedical.com
- https://www.performancehealth.com
- Please contact a certified AT specialist for further information on this topic.

3. Tactile Substitutions
    - Various tactile aids such as Braille signs or devices, vibrating electronic mobility devices, and tactile household items such as clocks and timers are also available for individuals seeking visual accommodations. Braille, a system of touch reading and writing, has long been used for individuals with visual impairments as a tactile aid by providing the individual a series of raised dots either on paper or through braille displays on the computer and on a keypad. For example, a keyboard with braille letters and commands or an iPad with Braille layovers may be needed for an individual who has difficulty seeing the letters on the keys and needs the tactile addition of the braille lettering on the keys in order to be able to perform their job as a receptionist. Various tactile household items are available as well, such as clocks and timers (see pictures below) may have raised numbers and dials to assist an individual with feeling for the correct time setting.

4. Auditory Substitutions
    - Auditory substitutions include but are not limited to voice assistants, talking tape measures (https://youtu.be/5JRjznofdhE), calculators, scales (https://www.everydaysight.com/talking-weight-scales/), and thermometers for individuals with visual impairments.

- Voice Assistants, such as Siri, Alexa, Google, or other internet software can also be utilized to provide auditory prompts such as telling time, reading recipe steps (https://www.youtube.com/watch?time_continue=1&v=qpwcPnqhcTE&feature=emb_logo), or ordering an Uber. Please watch the videos below for further Alexa demonstrations:
    - How to Create To-Do Lists: https://youtu.be/z3AKgQ0SILw
    - How to Listen to Music, Podcast, and Audiobooks: https://youtu.be/cOv9kDhr74k
    - How to Set Reminders: https://youtu.be/Lr92GMwTJVQ
    - How to use Alexa for Meal Preparation: https://youtu.be/9Hu5YBM7BhE
    - How to use the Drop-In feature on Alexa devices: https://youtu.be/lu3M_nggyGo

- For example, through the use of a talking calculator, an individual completing a math assignment will be able to correctly calculate the totals of the problems through the addition of the auditory number values. Please see this video for an example of how to use a talking calculator (https://youtu.be/FHHQ3tqofZQ). Similarly, a talking produce weighing scale such as from could tell you the weight of produce while packaging it and so forth.

5. Electronic Aids
    - Electronic aids for individuals with visual impairments include but are not limited to video magnifiers (see picture below on left), screen readers, and much more. Please see https://www.afb.org/blindness-and-low-vision/using-technology/assistive-technology-products/video-magnifiers for more information on video magnifiers Of note, there are many sizes and different types of video magnifiers available, including large desktop ones, portable ones, ones that talk, and ones with optical character recognition. Please see these videos for examples of how to use a video magnifier (https://youtu.be/buP8CtLe-H8) (https://www.afb.org/blindness-and-low-vision/using-technology/assistive-technology-videos/transcript-video-magnifiers).

    - For example, if an individual in need of visual accommodations is tasked to greet customers but also needs to perform other tasks in other areas of the store, they

may be able to use DoorCam (https://remoplus.co/products/doorcam2) to see a display five feet from them that portrays the store entrance much more easily than the individual is able to see the front of the store 200 ft away.

- Another example is the use of wearable magnifiers, such as Jordy Low Vision Glasses (see picture below on right), which are used for stationary work and not moving around or traveling because this is a safety hazard. Wearable magnifiers have a continuous play by play of everything the individual is viewing, whether it's hardcopy or on a computer screen. For more information please view https://www.afb.org/aw/19/2/15128 which has additional information on smartphone apps for individuals new to visual impairments.

a. Camera and Scanner Characteristics with Optical Character Recognition
    - Optical Character Recognition is also a valuable tool for individuals seeking visual accommodations because it can assist with the conversion of images of typed, handwritten or printed text into machine-encoded text, (whether that is from a scanned document, a photo of a document, a scene-photo or from subtitle text superimposed on an image) and then read the document or other item to the individual. For example, for an individual with a visual impairment that needs to read various documents or printed materials at work, an individual could simply scan a page and then know the contents of it after being read the contents through the app.

    - One example is the KNFB reader app (https://www.youtube.com/watch?v=6SXTC85Nuy0), and screen

reader apps such as Scan2Read. Other examples are Seeing AI (https://www.youtube.com/watch?v=DybczED-GKE), which can aid individuals with visual impairments by offering an audible reading of the text or image that is imported to it from a sign, email, etc. For example, for an individual working in a restaurant who has low vision, they could use Seeing AI to read off the ticket for an order.

6. Computer Access
    - Computer access aids for individuals seeking visual accommodations also largely vary on the specific type of computer access needs of the individual. Examples of computer access aids are Mac and Windows Accessibility features such as the "spoken content" or "speak screen feature on Mac devices. There are also screen magnification softwares (such as Zoomtext or ZoomReader), Word Speech to Text, Dragon, JAWS, and Kurzweil available to aid individuals with visual impairments by offering features to assist with accessing documents, their email, the internet, and much more. A good resource on tools that Google offers can be found at https://www.controlaltachieve.com/2016/10/special-needs-extensions.html.

    - For example, if an individual with a vision impairment with difficulty typing would like to write an email to a coworker they could dictate and send the message verbally through the use of the Mac's Accessibility features while never even having to touch a keyboard. Additionally, there are also keyboards that have higher contrasts available. Please see the videos below for more information:
        - How to use built-in magnifiers in chrome extensions or other google chrome extensions (screen masks, read aloud software) - (https://cloud.google.com/blog/products/chrome-enterprise/new-accessibility-features-in-chrome-browser-and-chrome-os)
        - How to use accessibility features on a Mac - (https://support.apple.com/guide/mac-help/use-accessibility-features-mh35884/mac)
        - How to Use Speak Screen on iOS Devices - (https://www.youtube.com/watch?v=UqmgHgscH0k)

7. Productivity and Social Participation Aids

- Productivity tools for individuals with visual impairments to assist with activities of daily living (ADL)'s or work accommodations can include:
    - Seeing AI app
    - VO Calendar app
    - VoiceOver (only on iOS devices)
    - ListRecorder (only on iOS devices)
    - Reader view (iOS, also extensions in Chrome?) (used to declutter webpages of ads)

- For example, Lancioni and colleagues (2014) found that who has multiple disabilities, such as for someone who is blind and has difficulty with time management, they would be able to use reminding technology (such as the VO Calendar for example) to input important dates and appointments and when they would like to be reminded of them. Additionally, there are various other apps and software tools that can help individuals with visual impairments complete or enhance their ability to perform specific tasks with ease. For more information on participation aids please contact an OT who specializes in AT or apply for individualized services with the Virginia Department for Aging and Rehabilitative Services (DARS).

Case Study Example:

Carl is a 61-year-old male who was diagnosed with muscular sclerosis three years ago. Carl works in sales and contacted DARS because the accommodations his work was providing him weren't meeting his needs. He reports difficulties seeing items on the computer screen although his co-workers will tell him, "they are right in front of you". Additionally, Carl has had two falls within the last month from his change in depth perception, resulting in a severe hand and arm injury. Upon meeting with an occupational therapist who specializes in assistive technology, different areas of assistive technology use in Carls's job and in the home were identified. The occupational therapist demonstrated the use of magnification options through Mac Accessibility features to limit the visual tracking and visual perception required that had been impeding his ability to utilize the computer. Additionally, a virtual home inspection was performed to identify potential fall hazards and it was recommended Carl follow up with his physical therapist for the use of a mobility device to prevent further falls. Since the meeting, Carl reports self-rated improved job performance and no further fall incidents.

References

Lancioni, G., Singh, N., O'Reilly, M., Sigafoos, J., Boccasini, A., Alberti, G., & Lang, R. (2014). People with multiple disabilities use basic reminding technology to engage in daily activities at the appropriate times. *Journal of Developmental and Physical Disabilities*, *26*(3), 347-355.

Thomas, R., Barker, L., Rubin, G., & Dahlmann-Noor, A. (2015). Assistive technology for children and young people with low vision. *The Cochrane database of systematic reviews*, (6), CD011350. https://doi.org/10.1002/14651858.CD011350.pub2